

REMARKS/ARGUMENTS

Claim 1 has been amended. Claims 13-15 were previously canceled. Claims 1-12 and 16-20 remain pending in the application. Applicants respectfully request reexamination and reconsideration of the application.

Initially, with regard to the Information Disclosure Statement originally mailed on January 23, 2004, Applicants acknowledge with appreciation the consideration of the prior art listed therein and the return of the list of references initialed by the Examiner.

Claims 1-12 and 16-20 were rejected under 35 USC §112, second paragraph, as being indefinite. Independent claim 1 has been amended to make clear that the word "conductive" modifies the elements "interconnect structures", and that the oscillating electromagnetic field heats the interconnect structures without substantially heating the substrate. As claims 2-12 and 16-20 depend from amended claim 1, Applicants respectfully submit that this rejection has now been overcome.

Claims 1-7, 10, 11, and 16 were rejected under 35 USC §102(b) as anticipated by US Patent No. 4,983,804 to Chan et al. ("Chan"). Claims 8 and 9 were rejected under 35 USC §103(a) as obvious in view of Chan. Claim 12 was rejected under §103 as obvious in view of Chan and US Patent No. 5,340,537 to Barrett ("Barrett"), claims 17-18 were rejected under §103 as obvious in view of Chan and US Patent No. 5,476,211 to Khandros ("Khandros"), and claims 19-20 were rejected under §103 as obvious in view of Chan and US Patent No. 6,150,186 to Chen et al. ("Chen"). Applicants respectfully traverse these rejections.

Chan is concerned with a method of selectively soldering only a portion of conductive members on a circuit board. See for example Col. 1, lines 50-54. In other words, Chan is interested in temporarily melting only certain portions of the solder on the circuit board, joining an electronic component to the circuit board, then returning the solder to its solid state to mechanically and electrically connect the component to the circuit board. In contrast, the present invention, as defined by amended claim 1, is concerned with changing the physical properties of interconnect structures such as microsprings by heat treatment. The desire is to improve the mechanical properties of the structures, such as by making them less brittle, provide them with higher yield strengths, and make them more resistant to material fatigue. Heat treatment involves heating the components to temperatures below their softening point. As such, soldering and heat treating are entirely different processes having different steps and concerns.

The motivation in Chen for using localized heating (heating some solder joints and not others) is to bond a component such as a flexible circuit (10) to a printed circuit board (11) without disturbing the solder joints of other electronic components such as chip packages (18 and 28) previously attached to the circuit board (11). Fig. 1 and Col. 2, lines 43-46. On the other hand, the motivation in the present invention for localized heating (heating all interconnect structures but not the substrate they are attached to) is to more accurately and consistently control the heat treatment of the interconnect structures, reduce the power required and to increase process throughput by not heating a substrate having a large thermal mass. The soldering process of Chan involves melting or reflowing the solder as quickly as possible, then allowing it to cool and re-solidify, so as not to damage other components or their solder joints. Typically, heating times are less than 20 seconds. Col. 2, line 68 to Col. 3, line 1. In contrast, longer time-temperature profiles are maintained for heat treatment applications. Page 5, paragraph [027] of the present application as filed.

Amended claim 1 recites providing interconnect structures comprising contact tips disposed away from a substrate, and maintaining the interconnect structures in an oscillating electromagnetic field until they obtain a defined heat-treatment temperature for a predetermined period of time sufficient to permanently improve a mechanical operating property of the interconnect structures. What is meant by “permanent” is that after the cooling step the improved mechanical operating property is maintained. While it can be argued that the process of Chan temporarily changes a property of the solder (when heating it to its melting point), there clearly is no permanent change to a mechanical operating property of the solder once it is cooled and returned to its original state.

As none of Chan, Chen, Barrett, or Khandros teaches or suggests such a process, independent claim 1 patentably distinguishes over those four references, whether taken singly or in combination.

Claims 2-12 and 16-20 depend from claim 1 and therefore also distinguish over Chan, Chen, Barrett, and Khandros for at least the reasons given above.

In view of the foregoing, Applicant submits that all of the claims are allowable and the application is in condition for allowance. If the Examiner believes that a discussion with

Applicant's attorney would be helpful, the Examiner is invited to contact the undersigned at (925) 290-4000.

No fee is believed due with this response. Should a fee be due, the Commissioner is hereby authorized to charge the fee to Deposit Account No. 50-0285 (order no. P148-US).

Respectfully submitted,

Date: November 29, 2004

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